1. A fuel injector system for an internal combustion engine said injector system comprising an inlet port; a spill port; a pressure intensifier comprised of a piston forming a working chamber and a plunger forming a compression chamber; a nozzle with a needle, a spring biasing the needle to close the nozzle, and an outlet chamber connected to the compression chamber; a non-return valve the inlet of the non-return valve being connected to the inlet port and the outlet of the non-return valve being connected to the compression chamber; an hydraulically controlled differential valve (HDV) having a seating face located between the inlet port and the working chamber, said HDV forming a control chamber and the HDV opens towards the working chamber, said HDV using a poppet opening into the working chamber upon release from the seating face, said poppet forming a fluid flow throttling slot and a poppet chamber, wherein a flow area of the throttling slot is up to 99% less than the flow area between the HDV and the seating face during a part of the travel of the HDV, said part of the travel being up to 80% of full travel of the HDV, further wherein said poppet chamber is connected to the control chamber via a bypass channel; resilient means for biasing the HDV towards its closed position; a solenoid valve installed between the control chamber and the spill port.

2. A fuel injector system for an internal combustion engine said injector system comprising an inlet port; a spill

port; a pressure intensifier comprised of a piston forming a working chamber and a plunger forming a compression chamber; a nozzle with a needle, a spring biasing the needle to close the nozzle, and an outlet chamber connected to the compression chamber; a non-return valve the inlet of the non-return valve being connected to the inlet port and the outlet of the non-return valve being connected to the compression chamber; an hydraulically controlled differential valve (HDV) having a seating face located between the inlet port and the working chamber, said HDV forming a control chamber and the HDV opens towards the working chamber, said HDV using a poppet opening into the working chamber upon release from the seating face, said poppet forming a fluid flow throttling slot and a poppet chamber, wherein a flow area of the throttling slot is up to 99% less than the flow area between the HDV and the seating face during a part of the travel of the HDV, said part of the travel being up to 80% of full travel of the HDV, further wherein said working chamber is connected to the control chamber via a bore; resilient means for biasing the HDV towards its closed position; a solenoid valve installed between the control chamber and the spill port.

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3. A fuel injector according to claim 1 [or 2], wherein the flow area of the throttling slot remains constant during the part of the travel of the HDV.

4. A fuel injector according to claim 1 wherein the working chamber is connected to the control chamber via a bore.

5. A fuel injector according to claim [2] 4, wherein a further non-return valve is installed in the bore, the inlet of said further non-return valve being connected to the control chamber.

6. A fuel injector according to claim 4 wherein a sealing cylindrical surface of the HDV is adapted to change the flow area of the bypass channel and close off the bypass channel depending on the axial position of the HDV.

7. A fuel injector according to claim 1 wherein the control chamber is connected to the inlet port via a channel and a sealing cylindrical surface of the HDV is adapted to vary the flow area of the channel and close off a channel in dependence on the axial position of the HDV.

8. A fuel injector according to claim 4 wherein the connection between the poppet chamber and control chamber is closed and the control chamber is connected to the inlet port with a channel and the sealing cylindrical surface of the HDV varying the flow area of the channel and adapted to close off the channel depending on the axial position of the HDV.

9. A fuel injector according to claim 1 wherein the non-return valve is adapted to be mechanically closed by a pressure intensifier.

10. A fuel injector according to claim 9 wherein resilient means is placed between the plunger and a locking element of the non-return valve such that when the pressure intensifier is in the bottom position the plunger closes the non-return valve transmitting a force required to close said valve through the resilient means.

11. A method of improving the reliability of a diesel engine equipped with a fuel injector [wherein] such that when there is an incomplete closing of a [fluid] fuel injection nozzle in one of the engine's cylinders [causes] an engine management system [to stop] stops supplying the injector of said one cylinder with electric control impulses, [whereby] and wherein a pressure intensifier in the fuel injector permanently closes off [the] a non-return valve, to thereby [preventing] prevent access of pressurised fuel to the [unsealed] incompletely closed nozzle[, which otherwise will cause significant increase in smoke emission and exhaust gas temperature of the engine or its breakdown].

12. A fuel injector according to claim 7 comprising an additional adjustable valve adapted to vary the flow area of the bypass channel or the channel.

13. A fuel injector according to claim 8 comprising an additional adjustable valve adapted to vary the flow area of the bypass channel or the channel.

14. A fuel injector according to claim 9 wherein additional resilient means is placed beneath the piston [to exert a force on the piston] to exert a force on the piston in the direction of upward movement of the piston.

on the piston to exert a force on the piston in the direction of upward movement of the piston.

15. A fuel injector according to claim 10 wherein additional resilient means is placed beneath the piston to exert a force on the piston [to exert a force on the piston] in the direction of upward movement of the piston.

16. A fuel injector according to claim 2, wherein the flow area of the throttling slot remains constant during the part of the travel of the HDV.

17. A fuel injector according to claim 2, wherein the control chamber is connected to the inlet port via a channel and a sealing cylindrical surface of the HDV is adapted to vary the flow area of the channel and close off a channel in dependence on the axial position of the HDV.

18. A fuel injector according to claim 2, wherein the non-return valve is adapted to be mechanically closed by a pressure intensifier.

19. A method of reducing the noise emanating from a diesel engine, wherein a fuel injection system delivers an amount of fuel required at a given operating condition of the engine for each combustion stroke in two or more stages being a pilot injection(s) and a main injection, said fuel injection system reaches its initial position between those stages, wherein the pilot injection(s) may occur at any instant from the closure of the exhaust valve of the cylinder to the last moment which leaves enough time for the fuel injection system to prepare for the main injection, said main injection occurring in the vicinity of top dead center of the compression stroke of the engine.

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